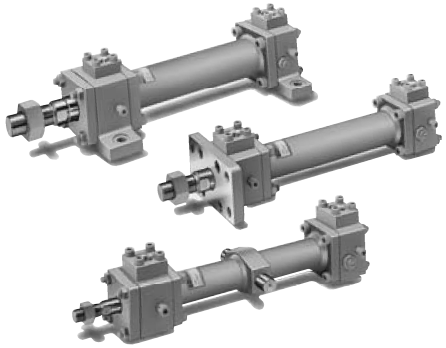
Applicable to special uses

- Hydraulic cylinders with bores of 40 to 250 mm designed to be installed and used on heavy machinery including steel mills
- Heavy-duty type resistant to surge pressure, vibration and impact
- High-performance hydraulic cylinders designed through careful examination of machining accuracy, surface treatment and sealing materials.
- Design based on advanced techniques allows the cylinders to be used for special purposes.
- Conforming to JOHS-110 of the Japan Fluid Power Association



Standard Specifications

Type		70M-3	140M-3
Nominal pressure		7 MPa	14 MPa
Maximum allowable pressure		14 MPa	23 MPa
Proof pressure		17 MPa	28 MPa
Minimum operating pressure		ϕ40 to ϕ140 : 0.3 ϕ160 to ϕ250 : 0.5	
Working speed range		ϕ40 to ϕ160 : 10 to 500mm/s	ϕ160 to ϕ250 : 20 to 500mm/s
Working temperature range (ambient temp. and oil temp.)		−10℃ to +80℃ (no freezing)	
Structure of cushioning		Metal fitting system	
Paint color		Munsell 7.5 BG 5.5/2.5	
Applicable fluid		Petroleum-based fluid (When using another fluid, refer to the table of fluid adaptability.)	
Tolerance for thread		JIS 6g/6H	
Tolerance of stroke		0 to 100mm $^{+0.8}_{0}$ 101 to 250mm $^{+1.0}_{0}$ 251 to 630mm $^{+1.25}_{0}$ 631 to 1000mm $^{+1.4}_{0}$ 1001 to 1600mm $^{+1.6}_{0}$ 1601 to 2000mm $^{+1.8}_{0}$	
Mounting style		SD, LA, FA, FB, CA, TC	
Accessory	Boots	Standard : Nylon tarpaulin Semi-standard : Chloroprene, Conex	
	Rod end attachment	Rod eye (T-end), rod clevis (Y-end)	
	Others	Lock nut	

Terminologies

Nominal pressure
Pressure given to a cylinder for convenience of naming
It is not always the same as the working pressure (rated pressure) that guarantees performance under the specified conditions.

Maximum allowable pressure
Maximum allowable pressure generated in a cylinder (surge pressure, etc.).

Proof pressure
Test pressure against which a cylinder can withstand without unreliable performance at the return to nominal pressure.

Minimum operating pressure
Minimum pressure at which cylinder installed horizontally operates under no load.

Notes)
- The hydraulic pressure generated in a cylinder due to the inertia of load must be lower than the maximum allowable pressure.
- Conex is the registered trademark of Teijin Limited.
- For the internal structure, refer to the sectional drawings at the end of this catalog.

Standard Stroke Range

Mounting styles other than TC

Unit: mm

Cylinder bore	ϕ40 to ϕ63	ϕ80 to ϕ160	ϕ180 to ϕ250
Stroke range	0 to 2000	51 to 2000	101 to 2000

TC style

Unit: mm

Cylinder bore	ϕ40 to ϕ80	ϕ100・ϕ125	ϕ140 to ϕ200	ϕ224・ϕ250
Stroke range	101 to 2000	151 to 2000	201 to 2000	251 to 2000

- The above strokes indicate the maximum available strokes for the standard type.
- For the rod buckling, check with the buckling chart in the selection materials. Contact us for longer strokes.

Cushion Stroke Length

Unit: mm

Cylinder bore	Cushion ring length	Cylinder bore	Cushion ring length
ϕ40 to ϕ63	20	ϕ180 to ϕ224	30
ϕ80 to ϕ160	25	ϕ250	35

- The cushion stroke lengths in case of cylinders used up to the stroke end.
- In the case that a cylinder is not used up to the stroke end, and it is stopped 5 mm or more before the stroke end, the cushioning effect will be weakened. In this case, consult us.

The following cylinders do not have cushions.
- Rod diameter type A : Rod side of cylinders with bores of 40, 50 and 63 mm
- Rod diameter type B : Rod side of cylinders with a bore of 40 mm

Product Lineup

Unit: mm

Series Variation	Type	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100	ϕ125	ϕ140	ϕ160	ϕ180	ϕ200	ϕ224	ϕ250
General purpose type	Double acting single rod	7MPa 70M-3	●	●	●	●	●	●	●	●	●	●	●
		14MPa 140M-3	●	●	●	●	●	●	●	●	●	●	●

Adaptability of Fluid to Seal Material

Seal material	Applicable fluid				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	Water in oil fluid	Oil in water fluid
2 Urethane rubber (standard)	◎	×	×	△	△
1 Nitrile rubber	○	○	×	○	○
3 Fluorocarbon	○	×	○	○	○

Notes) 1. ◎○ : Applicable × : Inapplicable Consult us before using the △-marked items.
2. The ◎-marked items are recommended seal materials in case of giving the first priority to abrasion-proof.

Piston Pressurized Area Table

Bore (mm)		ϕ40		ϕ50		ϕ63		ϕ80		ϕ100		ϕ125		ϕ140		ϕ160		ϕ180		ϕ200		ϕ224		ϕ250	
Rod type		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Rod dia. (mm)		ϕ28	ϕ22.4	ϕ35.5	ϕ28	ϕ45	ϕ35.5	ϕ56	ϕ45	ϕ71	ϕ56	ϕ90	ϕ71	ϕ100	ϕ80	ϕ112	ϕ90	ϕ125	ϕ100	ϕ140	ϕ112	ϕ160	ϕ125	ϕ180	ϕ140
Pressurized area mm²	Extension side	1256		1963		3117		5026		7853		12271		15393		20106		25446		31415		39408		49087	
	Retraction side	640	862	973	1347	1526	2127	2563	3436	3894	5390	5910	8312	7539	10367	10254	13744	13175	17592	16022	21563	19301	27136	23640	33693

● How to order

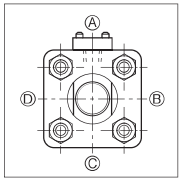
General Purpose Type

The item enclosed by broken line needs not to be entered, if unnecessary. Semi-standard specification

● Standard type	❶ Type	❷ Seal material	❸ Mounting style	❹ Cylinder bore	❺ Rod shape	❻ Cushioning	❼ Stroke		❽ Port position	❾ Cushion valve position	❿ Rod end thread type	⓫ Port type		⓬ Rod end attachment		⓭ Boots
	140M-3	2	LA	80	A	B	100	–	A	B	1	X	–	T	–	J

- ❶ Type: 70M-3 : For 7 MPa; 140M-3 : For 14 MPa
- ❷ Seal material: 2 Urethane rubber (standard); 1 Nitrile rubber (semi-standard); 3 Fluorocarbon (semi-standard)
- ❸ Mounting style
- ❹ Cylinder bore (mm): φ40 to φ250
- ❺ Rod shape: A Rod A; B Rod B
- ❻ Cushioning: B With cushion on both ends; R With cushion on rod side; H With cushion on cap side; N No cushion
- ❼ Cylinder stroke (mm)
- ❽ Port position (A, B, C, D)
- ❾ Cushion valve position (A, B, C, D, or O)
- ❿ Rod end thread type (1, 2, E)
- ⓫ Port type (X, Y, Z)
- ⓬ Rod end attachment: T T-end (rod eye); Y Y-end (rod clevis)
- ⓭ Boots: J Nylon tarpaulin; JN Chloroprene; JK Conex

✪ Standard specifications



- With cushions on both ends
- Port position Ⓐ
- Seal material : Urethane rubber

The rod seals of cylinders with bores of 160 mm or more are made of fabric-filled rubber and nitrile rubber.

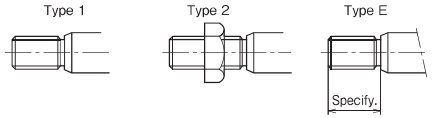
✪ Port and cushion valve positions

The standard port position is Ⓐ, and the standard cushion valve position is Ⓑ.
When modifying the positions, enter the symbol shown in the dimensional drawings.
In case that the cushion is not equipped, the cushion valve position is "O".

(All symbols of the port positions and cushion valve positions are shown clockwise as viewed from the rod side.)

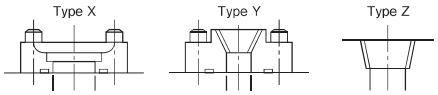
For cylinders with mounting style FA or FB (φ40 to φ80), ports cannot be made on Ⓑ or Ⓓ.

✪ Rod end thread type



The end thread of type 2 is longer than that of type 1 and has a lock nut.
If the customer does not specify the type, the cylinder will be provided with type 1 rod end thread.

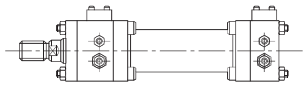
✪ Port type



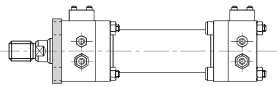
If the customer does not specify the type, the cylinder will be provided with type X port.

Mounting Style

SD SD style (basic style)

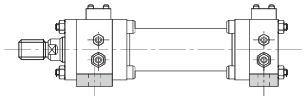


FA FA style (rod flange)

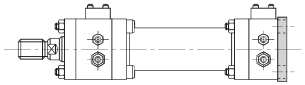


CA CA style (cap eye)

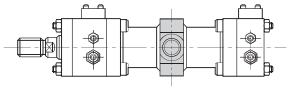
LA LA style (side lugs)



FB FB style (cap flange)



TC TC style (intermediate trunnion)



Adaptability of Fluid to Seal Material

Seal material	Applicable fluid				
	Petroleum-based fluid	Water-glycol fluid	Phosphate ester fluid	Water in oil fluid	Oil in water fluid
2 Urethane rubber (standard)	◎	×	×	△	△
1 Nitride rubber	○	○	×	○	○
3 Fluorocarbon	○	×	○	○	○

Notes) 1. ◎○ : Applicable × : Inapplicable Consult us before using the △-marked items.
2. The ◎-marked items are recommended seal materials in case of giving the first priority to abrasion-proof.

Cushion Manufacturing Range

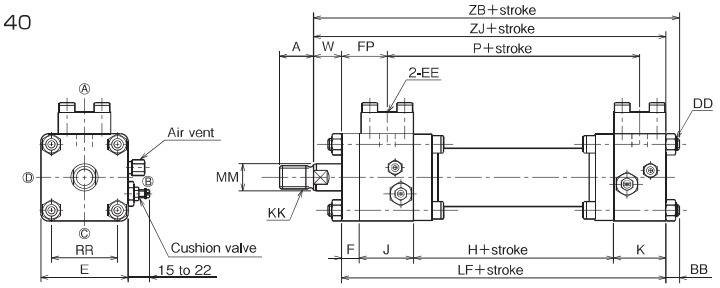
Bore	Rod A		Rod B	
	Extension side	Retraction side	Extension side	Retraction side
φ40	×	○	×	○
φ50	×	○	○	
φ63	×	○	○	
φ80	○		○	
φ100	○		○	
φ125	○		○	
φ140	○		○	
φ160	○		○	
φ180	○		○	
φ200	○		○	
φ224	○		○	
φ250	○		○	

The following cylinders do not have cushions.
Rod A : Rod side of cylinders with bores of 40, 50 and 63 mm
Rod B : Rod side of cylinders with a bore of 40 mm

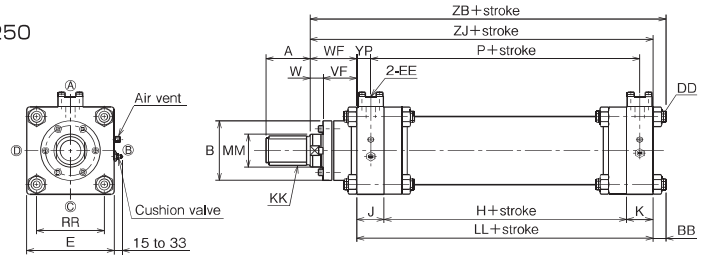
SD

70/140M-3 2 SD Bore B B Stroke – A B 1 X

ϕ40 to ϕ140



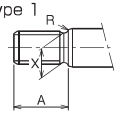
ϕ160 to ϕ250



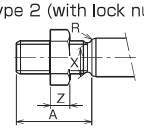
- The following cylinders do not have cushions.
  Rod diameter type A : Rod side of cylinders with bores of 40, 50 and 63 mm
  Rod diameter type B : Rod side of cylinders with a bore of 40 mm
- For the dimensions of the port flange, refer to "Accessories".
- The air vent and cushion valve positions vary depending on the cylinder bore.

Shape of rod end thread

Type 1



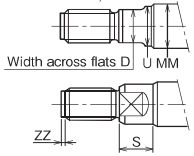
Type 2 (with lock nut)



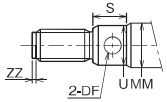
For the dimensions of the lock nut, refer to "Accessories".

Shape of rod end

Rod dia. of ϕ90 or less



Rod dia. of ϕ100 or more

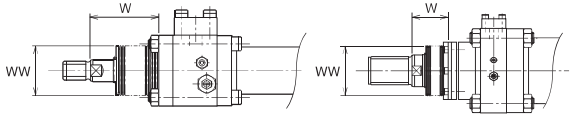


ϕ40 to ϕ140

ϕ40 · ϕ50 1/3.5 (1/2.5) stroke+X
ϕ63 to ϕ100 1/4 (1/3) stroke+X
ϕ125 · ϕ140 1/5 (1/3.5) stroke+X

ϕ160 to ϕ250

ϕ160 to ϕ200 1/5 (1/3.5) stroke+X
ϕ224 · ϕ250 1/6 (1/4.5) stroke+X



	Standard	Semi-standard	
Material	Nylon tarpaulin	Chloroprene	Conex
Heat proof	80℃	130℃	200℃

- Note that the parenthesized values apply in the case of Conex.
- The boots have been mounted at our factory prior to delivery.
- Conex is the registered trademark of Teijin Limited.

Bore	WW Rod A	WW Rod B	X
ϕ40	ϕ63	ϕ50	42
ϕ50	ϕ71	ϕ63	57
ϕ63	ϕ80	ϕ71	60
ϕ80	ϕ100	ϕ80	53
ϕ100	ϕ125	ϕ100	64
ϕ125	ϕ140	ϕ125	64
ϕ140	ϕ160	ϕ125	69
ϕ160	ϕ180	ϕ140	60
ϕ180	ϕ180	ϕ160	80
ϕ200	ϕ200	ϕ180	78
ϕ224	ϕ220	ϕ180	82
ϕ250	ϕ240	ϕ200	78

If the calculated value has a fractional part, round it up.

Dimensional Table

Bore	Rod A A Type 1	A Type 2	B	D	DF	KK	MM	R	S	U	X	Z	ZZ
ϕ40	35	55	—	24	—	M24×1.5	ϕ28	3	—	—	21.5	19	—
ϕ50	45	65	—	30	—	M30×1.5	ϕ35.5	3	—	—	27.5	24	—
ϕ63	60	85	—	41	—	M39×1.5	ϕ45	3	25	ϕ44	36.5	31	—
ϕ80	75	105	—	50	—	M48×1.5	ϕ56	3	28	ϕ55	45.5	38	—
ϕ100	95	140	—	65	—	M64×2	ϕ71	5	34	ϕ70	61	51	5
ϕ125	120	175	—	85	—	M80×2	ϕ90	5	39	ϕ89	77	64	5
ϕ140	140	210	—	—	ϕ12	M95×2	ϕ100	5	35	ϕ99	92	76	5
ϕ160	150	220	ϕ191	—	ϕ15	M100×2	ϕ112	5	30	ϕ111	97	80	5
ϕ180	180	265	ϕ208	—	ϕ15	M120×2	ϕ125	5	35	ϕ124	117	96	5
ϕ200	195	285	ϕ229	—	ϕ15	M130×2	ϕ140	5	33	ϕ139	127	104	5
ϕ224	225	330	ϕ253	—	ϕ15	M150×2	ϕ160	5	35	ϕ159	147	120	5
ϕ250	255	375	ϕ280	—	ϕ15	M170×3	ϕ180	5	35	ϕ179	165.5	136	8

Bore	Rod B A Type 1	A Type 2	B	D	DF	KK	MM	R	S	U	X	Z	ZZ
ϕ40	30	45	—	19	—	M20×1.5	ϕ22.4	3	—	—	17.5	16	—
ϕ50	35	55	—	24	—	M24×1.5	ϕ28	3	—	—	21.5	19	—
ϕ63	45	65	—	30	—	M30×1.5	ϕ35.5	3	25	ϕ34.5	27.5	24	—
ϕ80	60	85	—	41	—	M39×1.5	ϕ45	3	28	ϕ44	36.5	31	—
ϕ100	75	105	—	50	—	M48×1.5	ϕ56	3	34	ϕ55	45.5	38	—
ϕ125	95	140	—	65	—	M64×2	ϕ71	5	39	ϕ70	61	51	5
ϕ140	110	160	—	75	—	M72×2	ϕ80	5	40	ϕ79	69	58	5
ϕ160	120	175	ϕ162	85	—	M80×2	ϕ90	5	30	ϕ89	77	64	5
ϕ180	140	210	ϕ172	—	ϕ12	M95×2	ϕ100	5	35	ϕ99	92	76	5
ϕ200	150	220	ϕ191	—	ϕ15	M100×2	ϕ112	5	33	ϕ111	97	80	5
ϕ224	180	265	ϕ208	—	ϕ15	M120×2	ϕ125	5	35	ϕ124	117	96	5
ϕ250	195	285	ϕ229	—	ϕ15	M130×2	ϕ140	5	35	ϕ139	127	104	5

Bore	BB	DD	E	EE	F	FP	H	J	K	LF	LL	P	RR	VF	W	WF	YP	ZB	ZJ
ϕ40	11	M10×1.5	□80	SSA15	18	47	64	56	54	192	—	118	□60	—	29	—	—	232	221
ϕ50	13	M12×1.75	□90	SSA15	18	47	68	56	54	196	—	122	□68	—	29	—	—	238	225
ϕ63	14	M14×2	□110	SSA15	20	61	87	68	54	229	—	141	□80	—	40	—	—	283	269
ϕ80	16	M16×2	□127	SSA20	26	70	97	73	58	254	—	155	□98	—	33	—	—	303	287
ϕ100	19	M20×2.5	□154	SSA20	31	87	96	85	58	270	—	154	□120	—	39	—	—	328	309
ϕ125	22	M24×2	□188	SSA25	36	105	106	103	68	313	—	174	□144	—	44	—	—	379	357
ϕ140	26	M27×2	□212	SSA25	36	105	116	103	68	323	—	184	□162	—	49	—	—	398	372
ϕ160	28	M30×2	□238	SSA25	—	—	132	74	72	—	278	204	□184	92	35	127	38	433	405
ϕ180	30	M33×2	□272	SSA32	—	—	142	84	82	—	308	224	□214	92	40	132	43	470	440
ϕ200	33	M36×2	□298	SSA40	—	—	152	102	102	—	356	254	□232	102	38	140	51	529	496
ϕ224	35	M39×2	□328	SSA40	—	—	162	102	102	—	366	264	□256	112	42	154	51	555	520
ϕ250	38	M42×2	□362	SSA50	—	—	172	111	102	—	385	274	□286	127	48	175	60	598	560